

Appl. No. 10/691,451
Amdt. Dated August 3, 2007
Reply to Office Action of May 3, 2007

Attorney Docket No. 81716.0111
Customer No.: 26021

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A fuel cell casing comprising:

a base body made of multi-layer ceramics having a concavity for housing a membrane electrode assembly formed on one surface thereof, the membrane electrode assembly having in one principal surface and another principal surface thereof, a first electrode and a second electrode ~~disposed on one principal surface and another principal surface thereof~~, respectively;

a first fluid channel formed so as to extend from a bottom surface of the concavity facing the one principal surface of the membrane electrode assembly to an outer surface of the base body, the first fluid channel being for a first fluid;

a first wiring conductor having its one end disposed on the bottom surface of the concavity facing the first electrode of the membrane electrode assembly, and its other end led out toward the outer surface of the base body;

a lid body mounted on the one surface of the base body near the concavity so as to cover the concavity, for air-tightly sealing the concavity;

a second fluid channel formed so as to extend from one surface of the lid body facing the ~~the~~ other principal surface of the membrane electrode assembly to an outer surface of the lid body, the second fluid channel being for a second fluid different from the first fluid; and

a second wiring conductor having its one end disposed on the one surface of the lid body facing the second electrode of the membrane electrode assembly, and its other end led out toward the outer surface of the lid body; and

an internal circuit formed in the base body.

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2. (Canceled)

3. (Original) The fuel cell casing of claim 1, further comprising:

a heating element for heating the one or other principal surface of the membrane electrode assembly, which is formed on the periphery of at least one of the opening of the first fluid channel disposed on the bottom surface of the concavity and the opening of the second fluid channel disposed on the one surface of the lid body.

4. (Withdrawn) The fuel cell casing of claim 1, further comprising:

a hygroscopic member which is coated on at least one of the inner surface of the first fluid channel and the inner surface of the second fluid channel.

5. (Withdrawn) The fuel cell casing of claim 1, further comprising:

a heat-insulating layer which is formed in at least one of a part of the base body and a part of the lid body, the parts being in a vicinity of the concavity.

6. (Withdrawn) The fuel cell casing of claim 1, further comprising:

a hydrophobic coating which is coated on at least one of the inner surface of the first fluid channel and the inner surface of the second fluid channel.

7. (Original) The fuel cell casing of claim 1, wherein at least one of the first and second wiring conductors is formed around the opening of the first fluid channel disposed on the bottom surface of the concavity, or around the opening of the second

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fluid channel disposed on the one surface of the lid body, so as to abut against the first or second electrode, and has its surface coated with a corrosion-resistant metal.

8. (Withdrawn) The fuel cell casing of claim 1, wherein the first wiring conductor is formed around the opening of the first fluid channel disposed on the bottom surface of the concavity so as to abut against the first electrode; in a part of the base body which is located on another surface side from the first wiring conductor is formed a third wiring conductor in parallel with the first wiring conductor;

and a first connecting conductor is formed between the first fluid channels disposed in the base body, for connecting the first wiring conductor to the third wiring conductor,

and wherein the second wiring conductor is formed around the opening of the second fluid channel disposed on the one surface of the lid body so as to abut against the second electrode; in a part of the lid body which is located on another surface side from the second wiring conductor is formed a fourth wiring conductor in parallel with the second wiring conductor; and a second connecting conductor is formed between the second fluid channels disposed in the lid body, for connecting the second wiring conductor to the fourth wiring conductor.

9. (Withdrawn) The fuel cell casing of claim 1, wherein the first wiring conductor is formed around the opening of the first fluid channel disposed on the bottom surface of the concavity so as to abut against the first electrode; in a part of the base body which is located on another surface side from the first wiring conductor is formed a third wiring conductor in parallel with the first wiring conductor; and a first connecting conductor is formed on the inner circumferential

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surface of the first fluid channel disposed in the base body, for connecting the first wiring conductor to the third wiring conductor,

and wherein the second wiring conductor is formed around the opening of the second fluid channel disposed on the one surface of the lid body so as to abut against the second electrode; in a part of the lid body which is located on another surface side from the second wiring conductor is formed a fourth wiring conductor in parallel with the second wiring conductor; and a second connecting conductor is formed on the inner circumferential surface of the second fluid channel disposed in the lid body, for connecting the second wiring conductor to the fourth wiring conductor.

10. (Withdrawn) A fuel cell casing comprising:

a base body made of ceramics for housing therein at least a first electrode of a membrane electrode assembly, the membrane electrode assembly being made of a platy solid electrolyte having the first electrode and a second electrode which are formed on one principal surface and another principal surface thereof, respectively, in such a way that the solid electrolyte overhangs peripherally, the base body having a first concavity formed on one surface thereof, the first concavity having a placement portion formed in an outer periphery thereof for placing thereon an overhanging portion of the solid electrolyte;

a first fluid channel formed so as to extend from a bottom surface of the first concavity facing the one principal surface of the membrane electrode assembly to an outer surface of the base body;

a first wiring conductor having its one end disposed on the bottom surface of the first concavity facing the first electrode of the membrane electrode assembly, and its other end led out toward the outer surface of the base body;

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a lid body mounted on the one surface of the base body near the first concavity so as to cover the first concavity, for housing therein the second electrode, the lid body having a second concavity formed on a bottom surface thereof, the second concavity having an abutment portion formed in an outer periphery thereof so as to abut against the overhanging portion, for allowing the overhanging portion to be grippingly interposed between the abutment portion and the placement portion, the lid body sealing the first concavity hermetically;

a second fluid channel formed so as to extend from one surface of the lid body facing the other principal surface of the membrane electrode assembly to an outer surface of the lid body; and

a second wiring conductor having its one end disposed on the one surface of the lid body facing the second electrode of the membrane electrode assembly, and its other end led out toward the outer surface of the lid body.

11. (Withdrawn) The fuel cell casing of claim 10, wherein at least one of the first and second wiring conductors is formed around the opening of the first fluid channel disposed on the bottom surface of the first concavity, or around the opening of the second fluid channel disposed on a bottom surface of the second concavity, so as to abut against the first electrode or the second electrode.

12. (Withdrawn) The fuel cell casing of claim 10, further comprising:

a heating element for heating the one or other principal surface of the membrane electrode assembly, which is formed on the periphery of at least one of the opening of the first fluid channel disposed on the bottom surface of the first concavity and the opening of the second fluid channel disposed on the bottom surface of the second concavity.

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13. (Withdrawn) The fuel cell casing of claim 10, further comprising:
a hygroscopic member which is coated on at least one of the inner surface of the first fluid channel and the inner surface of the second fluid channel.

14. (Withdrawn) The fuel cell casing of claim 10, further comprising:
a heat-insulating layer which is formed in at least one of a part of the base body which part is in a vicinity of the first concavity and a part of the lid body which part is in a vicinity of the second concavity.

15. (Withdrawn) A fuel cell casing comprising:
a base body made of ceramics for housing therein at least a first electrode of a membrane electrode assembly, the membrane electrode assembly being made of a platy solid electrolyte having the first electrode and a second electrode which are formed on one principal surface and another principal surface thereof, respectively, in such a way that the solid electrolyte overhangs peripherally, the base body having a concavity formed on one surface thereof, the concavity having a placement portion formed in an outer periphery thereof for placing thereon an overhanging portion of the solid electrolyte;

a first fluid channel formed so as to extend from a bottom surface of the concavity facing the one principal surface of the membrane electrode assembly to an outer surface of the base body;

a first wiring conductor having its one end disposed on the bottom surface of the concavity facing the first electrode of the membrane electrode assembly, and its other end led out toward the outer surface of the base body;

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a lid body mounted on the one surface of the base body near the concavity so as to cover the concavity, for air-tightly sealing the concavity;

a second fluid channel formed so as to extend from one surface of the lid body facing the other principal surface of the membrane electrode assembly to an outer surface of the lid body; and

a second wiring conductor having its one end disposed on the one surface of the lid body facing the second electrode of the membrane electrode assembly, and its other end led out toward the outer surface of the lid body.

16. (Withdrawn) The fuel cell casing of claim 15, wherein at least one of the first and second wiring conductors is formed around the opening of the first fluid channel disposed on the bottom surface of the concavity, or around the opening of the second fluid channel disposed on the one surface of the lid body, so as to abut against the first or second electrode.

17. (Withdrawn) The fuel cell casing of claim 15, further comprising:

a heating element for heating the one or other principal surface of the membrane electrode assembly, which is formed on the periphery of at least one of the opening of the first fluid channel disposed on the bottom surface of the concavity and the opening of the second fluid channel disposed on the one surface of the lid body.

18. (Withdrawn) The fuel cell casing of claim 15, further comprising:

a hygroscopic member which is coated on at least one of the inner surface of the first fluid channel and the inner surface of the second fluid channel.

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19. (Withdrawn) The fuel cell casing of claim 15, further comprising:
 a heat-insulating layer which is formed in at least one of a part of the base body and a part of the lid body, the parts being in a vicinity of the concavity.

20. (Currently amended) A fuel cell comprising:
 a membrane electrode assembly having in one principal surface and another principal surface thereof, a first electrode and a second electrode ~~disposed on one principal surface and another principal surface thereof~~, respectively; and

the fuel cell casing of claim 1,

wherein the membrane electrode assembly is housed in the concavity of the fuel cell casing, the one and other principal surfaces of the membrane electrode assembly are arranged such that fluid can be exchanged between the one and other principal surfaces and their corresponding first and second fluid channels, the first and second electrodes are electrically connected to the first and second wiring conductors, respectively, and the lid body is mounted on the one surface of the base body near the concavity so as to cover the concavity.

21. (Withdrawn) An electronic apparatus comprising:
 the fuel cell of claim 20, acting as a power source,
 wherein the base body is made of multi-layer ceramics, and an external connection terminal is formed in at least one of the base body and the lid body.

22. (Withdrawn) The electronic apparatus of claim 21, further comprising:
 an internal circuit which is formed in the base body.

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23. (Withdrawn) The electronic apparatus of claim 21, further comprising:
an electronic part which is formed on the surface of the base body so as to be electrically connected to the internal circuit.

24. (Withdrawn) The electronic apparatus of claim 21, further comprising:
a piezoelectric pump which is disposed partway along one of the first and second fluid channels.

25. (Withdrawn) A fuel cell comprising:
a membrane electrode assembly made of a platy solid electrolyte having a first electrode and a second electrode which are formed on one principal surface and another principal surface thereof, respectively, in such a way that the solid electrolyte overhangs peripherally; and
the fuel cell casing of claim 10,
wherein the membrane electrode assembly is placed on the placement portion of the fuel cell casing, the one and other principal surfaces of the membrane electrode assembly are arranged such that fluid can be exchanged between the one and other principal surfaces and their corresponding first and second fluid channels, the first and second electrodes are electrically connected to the first and second wiring conductors, respectively, and the lid body is mounted on the one surface of the base body near the first concavity so as to cover the first concavity.

26. (Withdrawn) An electronic apparatus comprising:
the fuel cell of claim 25, acting as a power source,
wherein the base body is made of multi-layer ceramics, and an external connection terminal is formed in at least one of the base body and the lid body.

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27. (Withdrawn) The electronic apparatus of claim 26, further comprising:
an internal circuit which is formed in the base body.

28. (Withdrawn) The electronic apparatus of claim 26, further comprising:
an electronic part which is formed on the surface of the base body so as to be
electrically connected to the internal circuit.

29. (Withdrawn) The electronic apparatus of claim 26, further comprising:
a piezoelectric pump which is disposed partway along one of the first and
second fluid channels.

30. (Withdrawn) A fuel cell comprising:
a membrane electrode assembly made of a platy solid electrolyte having a
first electrode and a second electrode which are formed on one principal surface and
another principal surface thereof, respectively, in such a way that the solid
electrolyte overhangs peripherally; and
the fuel cell casing of claim 15,

wherein the membrane electrode assembly is placed on the placement portion
of the fuel cell casing, the one and other principal surfaces of the membrane
electrode assembly are arranged such that fluid can be exchanged between the one
and other principal surfaces and their corresponding first and second fluid
channels, the first and second electrodes are electrically connected to the first and
second wiring conductors, respectively, and the lid body is mounted on the one
surface of the base body near the concavity so as to cover the concavity.

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31. (Withdrawn) An electronic apparatus comprising:
the fuel cell of claim 30, acting as a power source,
wherein the base body is made of multi-layer ceramics, and an external
connection terminal is formed in at least one of the base body and the lid body.

32. (Withdrawn) The electronic apparatus of claim 31, further comprising:
an internal circuit which is formed in the base body.

33. (Withdrawn) The electronic apparatus of claim 31, further comprising:
an electronic part which is formed on the surface of the base body so as to be
electrically connected to the internal circuit.

34. (Withdrawn) The electronic apparatus of claim 31, further comprising:
a piezoelectric pump which is disposed partway along one of the first and
second fluid channels.